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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Horst Wernz

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06/08/2009

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EXAMINER

NGO, TANYA T

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/562,760	Applicant(s) WERNZ ET AL.	
	Examiner TANYA NGO	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 4/22/4009 have been fully considered but they are not persuasive.
2. Regarding arguments concerning Claim 15, applicant argues that the distinguish part of both solutions is "how the drive signals are generated to obtain optical pulses" (Pg. 4, paragraph II). The applicant states that the drive voltage in the application is "not pulses, but a (manipulated) NRZ signal" (Pg. 4, paragraph III). However, the applicant later argues that the "present invention uses a pulsed electrical drive signal" (Pg. 4, paragraph IV). Since the arguments presented contradict each other, the examiner is unable to interpret from the presented arguments what the applicant is arguing

Furthermore, it is respectfully submitted that the applicant's arguments is not commensurate in the scope of the claims. The presently recited claim does not require having a "(manipulated) NRZ signal". The argument that the electrical drive signal is "a pulsed electrical dive signal" is commensurate in the scope of the Claim 15, however, Froberg discloses and pulsed drive signal, (see Fig. 8A), which is a voltage data stream generated by a data source that is a "pulsed electrical drive signal".

3. Regarding applicants arguments with respect to 35 U.S.C. 103 of Claim 15, applicant's arguments have been fully considered by are not found persuasive. Applicant argues that Froberg teaches away from the modification because the method requires two successive pulses two have the same phase imposed on them, rather than two different phase

values of zero and pi. However, it is respectfully submitted that the applicant's arguments is not commensurate in the scope of the Claim 15. Claim 15 does not presently require having two different phase values of zero and pi.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Froberg in view of Layton US Patent 4,753,529.

Re Claim 15, Froberg discloses an apparatus for transmitting optical pulse signals using a return-to-zero (RZ-DPSK) (Froberg, Col. 2, lines 4-10) format comprising of:

- A source for an optical carrier enabled through a laser (Froberg, 12, Fig. 1);
- An electro-optical modulator (16, Fig. 1), preferably a Mach-Zehnder Interferometer (MZI) (Froberg, Col. 4, lines 16-18), with an optical path in the form of an optical fiber (Froberg, 19, Fig. 1) (Froberg, Col. 3, lines 52-53);

- a driver circuit for generating the driver signal from an electrical communication signal in the form of an encoder (Froberg, 24, Fig. 1), which drives two inputs to two different waveguides (Froberg, Col. 5, lines 23-24) spaced in time by a neutral signal state (Froberg, Col. 6, lines 54-56, Fig. 8D), wherein the presence of the neutral state of the driver

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signal the transmission of the modulator becomes zero, and the two types of impulse cause a transmission of the modulator which is different from zero and a phase shift which is specific for each type of the impulses (Froberg, Col. 5, lines 26-43, Fig. 8E and F).

Froberg does not disclose that the optical pathlength is adapted to be modified by an electrical driver signal. However, Layton discloses the adjustment of pathlength of interferometers such as Mach-Zehnder to correct pathlength mismatch (Layton, Col. 2, lines 25-43) by monitoring signals output from the interferometer. The examiner is interpreting the “monitoring signals output from the interferometer” to be the “electrical driver signal” because the monitoring signals determine if the pathlength needs to be adjust either to produce a predetermined signal or a null signal (Layton, Col 2, lines 30-42). The advantage of correcting the mismatch is to propagate equal intensities to avoid backward reflection and excessive loss of energy (Layton, Col. 6, lines 39-46). Therefore, it would have been obvious at the time of the invention for one of ordinary skill in the art to modify the apparatus disclosed by Froberg and include the ability adjust the pathlength or waveguide in the modulator via an electrical driver signal in order to achieve the aforementioned advantage, which is the reduction of backward reflection and excessive loss of energy.

Re Claim 16, Froberg and Layton discloses all the elements of Claim 15, which Claim 16 is dependent upon. Froberg further discloses the phase shifts should differ by π , which is equivalent to an 180° phase shift (Froberg, Col. 5, lines 17-20).

Re Claim 17, Froberg and Layton discloses all the elements of Claim 15, which Claim 17 is dependent upon. Froberg discloses that the modulator is a Mach-Zehnder

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interferometer (Froberg, Col. 2, lines 33-35) having arms enabled through two output waveguides (Froberg, Col. 4, line 67 to Col. 5, line 2). The examiner is interpreting the "arms" to be "waveguides" because a fiber optical Mach-Zehnder interferometer typical has a reference arm comprising a first length of optical, which is a waveguide, and a sensing arm comprising a second length of optical fiber, which is also another waveguide (Layton, Col. 1, lines 28-30). Each of these waveguides is independently controllable via the drive electrodes in the MZI (Layton, Col. 4, lines 40 – 50). Froberg does not disclose that there is one arm in which a neutral signal level corresponds to a path length difference between the arms of the half of the carrier wavelength of the optical carrier. Layton discloses a method for determining the difference in the interferometers arms is determined by the frequency of a null signal output from the interferometer (Layton, Col. 2, lines 43-51). The examiner is interpreting the "null" signal to be equivalent to the "neutral" signal because they both determine the difference between the arms, allowing for compensation for the mismatch. This would naturally flow from the previous modification of Froberg in light of Leyton.

Re Claim 18, Froberg and Layton discloses all the elements of Claim 15, which Claim 18 is dependent upon. Froberg discloses that within the transmitter, there are two drive electrodes that control separate waveguides and transmit the driver signals, which are impulses, across their respective waveguides (Froberg, Col. 4, lines 41-54).

Re Claim 19, Froberg and Layton discloses all the elements of Claim 15, which Claim 19 is dependent upon. Froberg discloses that each of the drive electrodes is connected to a

lead which is disposed over a portion of the waveguide, which is the optical path (Froberg, Col. 4, lines 50-54).

Re Claim 20, Froberg and Layton discloses all the elements of Claim 15, which Claim 20 is dependent upon. Froberg discloses a differential circuit enabled by the differential encoder (24, Fig. 1) which forms a pre-coded signal representative of a difference between subsequent bits of the electrical communication signal, and the driver signal is derived from the original signal (Froberg, Col. 6, lines 16-27).

6. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Froberg and Layton as applied to claim 20 above, and further in view of Bonthron et al US PG PUB 2003/0063698 A1 (herein after Bonthron).

Re Claim 21, Froberg and Layton discloses all the elements of Claim 20, which Claim 21 are dependent upon. Froberg and Layton do not disclose that the different circuit comprises of an XOR gate and a flip-flop. Bonthron discloses a differential encoder that comprises of an XOR-gate (110, Fig. 1) and a D type flip-flop (120, Fig. 1). (Bonthron , Paragraph [0006]) It would have been obvious for one of ordinary skill at the time of the invention to include the differential circuit disclosed by Bontron in the system described by Froberg and Layton because it includes a clock signal for synchronization and reduced race conditions and duty cycle distortion in the output signal (Bonthron , paragraph [0005]).

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7. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Froberg and Layton as applied to claim 15 above, and further in view of Laletin US PG PUB 2003/015453 A1.

Re Claim 27, Froberg and Layton disclose all the elements of Claim 15, which Claim 27 is dependent upon. Froberg and Layton do not disclose a control means for varying a ratio between the duration of the impulses and the duration of the neutral state. Laletin discloses a controller for generating a period signal with an adjustable duty cycle that is linearly responsive to an input voltage that provides continuously adjustable control of the width of a periodically repeating digital pulse, thereby achieving a linear voltage to duty-cycle ratio transfer function (Abstract). The advantage of having the ability of vary the duty cycle is to provide a wide ranger of clock frequencies (paragraph [0057]). Therefore, it would have been obvious for one of ordinary skill that the time of the invention to modify the invention of Froberg and Layton with the teaching of Laletin to include a controller for generating a signal with an adjustable duty cycle that is responsive to an input voltage in order to attain the aforementioned advantage, which the is ability to produce a wider range of clock frequencies (Laletin, paragraph [0057]).

8. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Froberg, Layton, and Laletin as applied to claim 27 above, and further in view of Schiwiek, DE 3625318 A.

Re Claim 28, Froberg, Layton, and Laletin disclose all the elements of Claim 27, which Claim 28 is dependent upon. Froberg, Layton, and Laletin do not disclose that the

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controls means is a mono-flop located in a clock line of the driver circuit. Schiwek discloses the use of a mono-flop 77(Schiwek, MF 1, Fig. 1) in order to offset the clock pulse (Schiwek, TAK, 1, Fig. 1). The advantage of using a mono-flop is that mono-flop stage signal preferably have identical interval and pulse length, and clock pulse signals that are equidistantly are in a fault free operation (Schiwek, Basic-Abstract). Therefore, it would have been obvious for one of ordinary skill at the time of the invention to modify the teaching of Froberg, Layton, and Laletin with the teaching of Schiwek and control the clock pulse offset with a mono-flop in the clock line circuit in order to obtained the aforementioned advantage, which is having identical interval and pulse lengths (Schiwek, Basic-Abstract).

Allowable Subject Matter

9. Claims 22 - 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Re Claim 22, there is no suggestion in the art, applied individually or in combination, to propose that the driver circuit comprises of four pairs of switches, each having first and second main ports and a control port, wherein each pair the first main ports of the switches.

Re Claim 23-26, these claims are dependent upon claim 22, and inherit the characteristics of Claim 22, including allowability.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **TANYA NGO** whose telephone number is (571) 270-7488. The examiner can normally be reached on **M - F from 9 am - 5 pm**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Kenneth Vanderpuye** can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngo/

June 1, 2009

/Kenneth N Vanderpuye/

Supervisory Patent Examiner, Art Unit 2613